

## Claims:

1. A repeater for interfacing between a digital service network and a local network span comprising:

a first input port for connection to a first digital carrier link for coupling to a digital network;

5 a first output port for connection to a second digital carrier link for coupling to digital terminal equipment;

a first signal transmission path between the first input and output ports;

a second input port for connection to the second digital carrier link for coupling to digital terminal equipment;

10 a second output port for connection to the first digital carrier link for coupling to a digital network;

a second signal transmission path between the second input and output ports;

a first selectably-activated loopback circuit which, when activated provides a third signal transmission path between the first input port and the second output port;

15 a second selectably-activated loopback circuit which, when activated, provides a fourth signal transmission path between the second input port and the first output port; and

a controller coupled with the first and second selectably-activated loopback circuits configured to selectively activate the first and second selectably-activated loopback circuits individually and simultaneously.

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2. The repeater of claim 1, wherein

the first signal transmission path further comprises a first signal regenerator; and

the second signal transmission path further comprises a second signal regenerator.

3. The repeater of claim 2, further comprising:

a multi-position switch which activates the first signal regenerator when in a first position and de-activates the first signal regenerator when in a second position.

4. The repeater of claim 2, wherein

the third transmission path further comprises the first signal regenerator when the first selectably-activated loopback circuit is activated; and

the fourth transmission path further comprises the second signal regenerator when the  
5 second selectably-activated loopback circuit is activated.

5. The repeater of claim 1, further comprising:

a first visual indicator which signals when only the first selectably-activated loopback circuit is activated;

a second visual indicator which signals when only the second selectably-activated  
5 loopback circuit is activated; and

a third visual indicator which signals when the first and second selectably-activated loopback circuits are both activated

6. The repeater of claim 1, further comprising:

a multi-state visual indicator, with a plurality of visually distinct operating states configured to:

operate in a first state when only the first selectably-activated loopback circuit is  
5 activated;

operate in a second state when only the second selectably-activated loopback circuit is activated; and

operate in a third state when the first and second selectably-activated loopback circuits are both activated.

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7. The repeater of claim 1, wherein the first signal transmission path further comprises:

a line build-out circuit.

8. The repeater of claim 1, wherein the second signal transmission path further comprises:

a pre-equalizing line build-out circuit.

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12. The repeater of claim 1, further comprising:

a first monitor jack for non-intrusively providing a monitor connection with the first signal transmission path; and

a second monitor jack for non-intrusively providing a monitor connection with the  
5 second signal transmission path.

13. The repeater of claim 12, further comprising:

a third jack for providing signal access to the first digital carrier link for coupling to a digital network; and

a fourth jack for providing signal access to the second digital carrier link for coupling to  
5 digital terminal equipment.

14. The repeater of claim 13, wherein signal access comprises signal detection and signal injection.

15. The repeater of claim 1, further comprising:

a first frame format detector configured to determine a first format of a first signal on the first signal transmission path;

a second frame format detector configured to determine a second format of a second  
5 signal on the second transmission path;

a first visual indicator which provides one of a first plurality of indications based on the first format; and

a second visual indicator which provides one of a second plurality of indications based the second format.

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16. The repeater of claim 15 wherein the first and second formats of the first and second signals, respectively, are one of unframed, SF/D4, and T1-ESF.

17. The repeater of claim 1, wherein the first input port and the second output port are adapted for connection to a DSX-1 network.

18. The repeater of claim 1, wherein the second input port and the first output port are adapted for connection to a T1 span.

19. The repeater of claim 1, wherein the physical dimensions of the repeater conform to a circuit-card specification for a standard wall-mountable telecommunications shelf.

20. The repeater of claim 19 wherein the circuit-card specification is one of a 200-type or 400-type form factor.

21. The repeater of claim 19 wherein the physical dimensions are less than substantially 13.5mm in length and less than substantially 14mm in height.

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22. A terminal extension repeater for interfacing between a digital service network and a local network span comprising:

a first input port for connection with a terminal side of the digital service network, the first input port receiving a first digital signal;

5 a first output port for connection with a network side of the local network span connected with customer premises equipment, the first output port providing a first regenerated signal to the local network span;

10 a second input port for connection with the network side of the local network span connected with customer premises equipment, the second input port receiving a second digital signal;

a second output port for connection with the terminal side of the digital service network, the second output port providing a second regenerated signal to the digital service network;

a first signal regenerator coupled between the first input and output for generating the first regenerated signal based on the first digital signal;

15 a second signal regenerator coupled between the second input and output for generating the second regenerated signal based on the second digital signal;

a first selectably-activated loopback circuit which, when activated, loops the first regenerated signal to the second output port;

20 a second selectably-activated loopback circuit which, when activated, loops the second regenerated signal to the first output port; and

a controller coupled with the first and second selectably-activated loopback circuits configured to selectively activate the first and second selectably-activated loopback circuits individually and simultaneously.

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23. The terminal extension repeater of claim 22, wherein the controller further comprises:  
a first loopback code detector configured to:

remotely activate the second selectably-activated loopback circuit when the second loopback code detector determines the second digital signal includes a loop-up code and the second selectably-activated loopback circuit is in a de-activated state;

remotely de-activate the second selectably-activated loopback circuit when the second loopback code detector determines the second digital signal includes a loop-down code and the second selectably-activated loopback circuit is in an activated state; and

remotely de-activate the first selectably-activated loopback circuit when the second loopback code detector determines the second digital signal includes a loop-down code and the first selectably-activated loopback circuit is in an activated state.

24. The terminal extension repeater of 23, wherein the first loopback detector is adapted to detect loop-up and loop-down codes in a plurality of formats.

25. The terminal extension repeater of claim 23, further comprising:

a second loopback code detector configured to:

remotely activate the first selectably-activated loopback circuit when the first loopback code detector determines the first digital signal includes a loop-up code and the first selectably-activated loopback circuit is in a de-activated state;

remotely de-activate the first selectably-activated loopback circuit when the first loopback code detector determines the first digital signal includes a loop-down code and the first selectably-activated loopback circuit is in an activated state; and

remotely de-activate the second selectably-activated loopback circuit when the first loopback code detector determines the first digital signal includes a loop-down code and the second selectably-activated loopback circuit is in an activated state.

26. The terminal extension repeater of claim 25, wherein the second loopback detector is adapted to detect loop-up and loop-down codes in a plurality of formats.

a multi-position local switch which, in a first position, simultaneously activates the first and second selectably-activated loopback circuits and, in a second position, de-activates all of the first and second selectably-activated loopback circuits which are activated.

a line build out circuit which adjustably attenuates the first regenerated signal before the first regenerated signal reaches the first output port; and

a first monitor jack for non-intrusively providing a monitor connection with the first digital signal; and

a first frame format detector configured to determine a first format of the first signal;

a first visual indicator which provides one of a first plurality of indications based on the first format; and

31. The terminal extension repeater of claim 30 wherein the first and second formats of the first and second signals, respectively, are one of unframed, SF/D4, and T1-ESF.



32. The terminal extension repeater of claim 22, wherein:

the first input port and the second output port are adapted for connection to a DSX-1 network; and

the second input port and the first output port are adapted for connection to a T1 span.

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33. The terminal extension repeater of claim 22, wherein the physical dimensions of the terminal extension repeater conform to a circuit-card specification for a standard wall-mountable telecommunications shelf.

34. The terminal extension repeater of claim 33 wherein the circuit-card specification is one of a 200-type or 400-type form factor.

35. The terminal extension repeater of claim 33 wherein the physical dimensions are less than substantially 13.5mm in length and less than substantially 14mm in height.

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a first input port for connection to a first digital carrier link to a digital network;  
a first output port for connection to a second digital carrier link to digital terminal equipment;

a second input port for connection to the second digital carrier link to digital terminal equipment;

a first monitor jack for non-intrusively providing a monitor connection with the first signal transmission path; and

37. The repeater of claim 36, further comprising:

38. The repeater of claim 37, further comprising:

a second frame format/detector configured to determine a second format of a second signal on the second transmission path;

a second visual indicator which provides one of a second plurality of indications based the second format.

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39. The repeater of claim 38 wherein the first and second formats of the first and second signals, respectively, are one of unframed, SF/D4, and T1-ESF.

40. The repeater of claim 36, wherein the physical dimensions of the repeater conform to a circuit-card specification for a standard wall-mountable telecommunications shelf.

41. The repeater of claim 40 wherein the circuit-card specification is one of a 200-type or 400-type form factor.

42. The repeater of claim 40 wherein the physical dimensions are less than substantially 13.5mm in length and less than substantially 14mm in height.

43. A repeater for interfacing between a digital service network and a local network span comprising:

a first input port for connection to a first digital carrier link to a digital network;

a first output port for connection to a second digital carrier link to digital terminal equipment;

a first signal transmission path between the first input and output ports;

a second input port for connection to the second digital carrier link to digital terminal equipment;

a second output port for connection to the first digital carrier link to a digital network;

a second signal transmission path between the second input and output ports;

a first monitor jack for non-intrusively providing a monitor connection with the first signal transmission path;

a second monitor jack for non-intrusively providing a monitor connection with the

second signal transmission path;

a first frame format detector configured to determine a first format of a first signal on the first signal transmission path;

a second frame format detector configured to determine a second format of a second signal on the second transmission path;

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- 25 a first visual indicator which provides one of a first plurality of indications based on the first format; and
- a second visual indicator which provides one of a second plurality of indications based the second format.
44. The repeater of claim 43, wherein the physical dimensions of the repeater conform to a circuit-card specification for a standard wall-mountable telecommunications shelf.
45. The repeater of claim 44 wherein the circuit-card specification is one of a 200-type or 400-type form factor.
46. The repeater of claim 44 wherein the physical dimensions are less than substantially 13.5mm in length and less than substantially 14mm in height.

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